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(52) UK CL (Edition S )

**A5R RHEC**

(56) Documents Cited

**GB 1363389 A EP 0020288 A1 US 5071537 A**  
**US 3788317 A US 3580239 A**

(58) Field of Search

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**1/04**  
**Online: WPI, EPODOC, JPIO**

(54) Abstract Title

**Porous body probe electrode utilising an isotonic solution**

(57) A porous body probe electrode having a porous tip 10 for making contact with the human or animal body which is gravity fed by an isotonic saline solution contained in a plastic tube 11 to which electrical connection is made 14-20 (inclusive) for making in conjunction with sensitive electrical measuring instruments accurate electrical measurements of AC and DC skin potentials of the human or animal body and resistance or impedance measurements between points on the human or animal body and the currents produced by such electrical potentials and of making a good electrical connection between any part of the human or animal body and earth and for effectively applying any external voltage to any part of the human or animal body.

The probe may be strapped to a patient or designed to receive a finger or a toe.

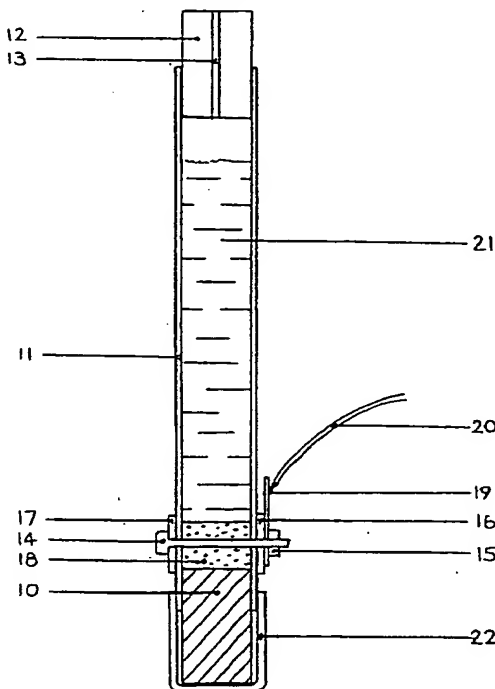


FIGURE 1

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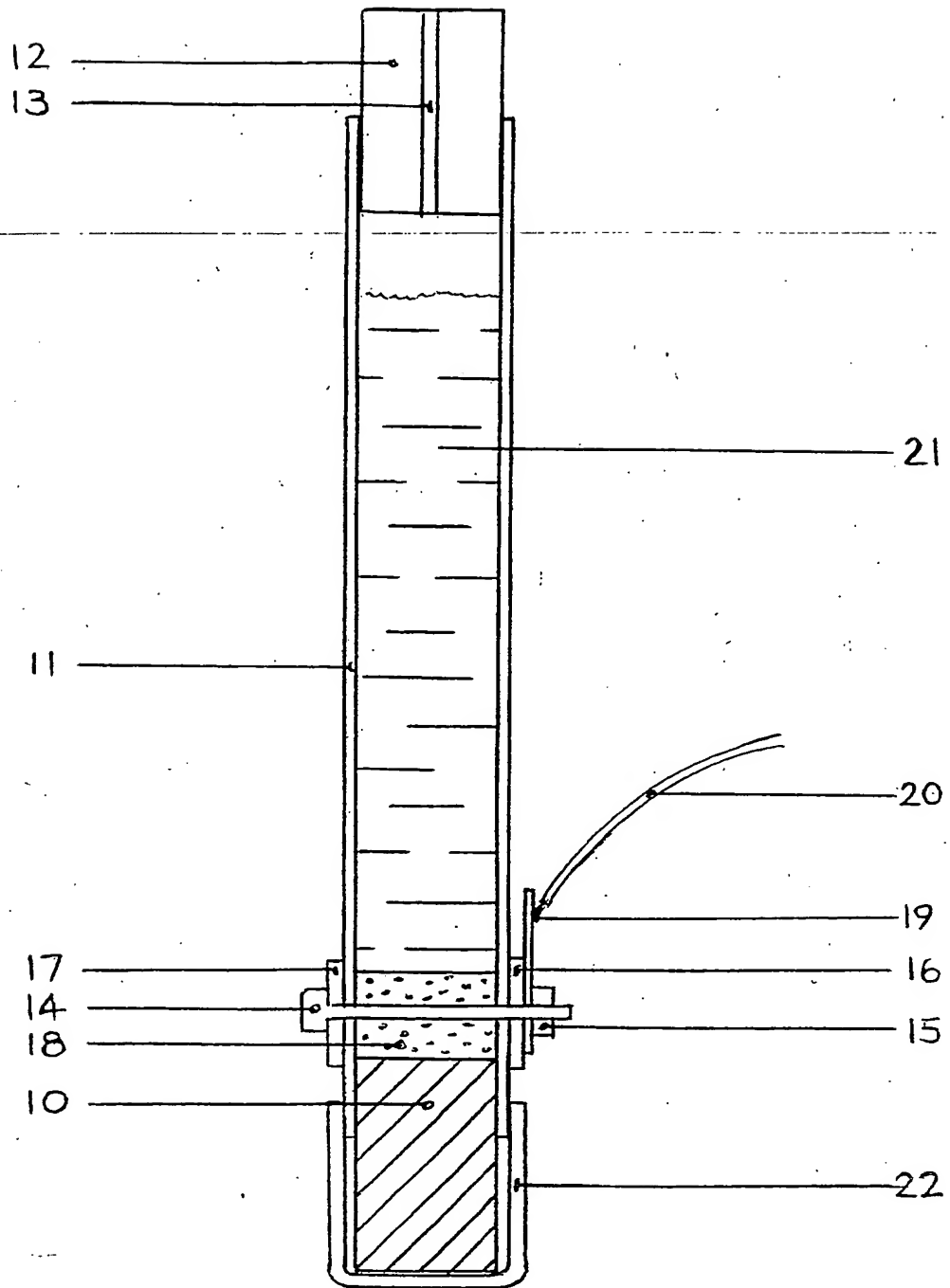


FIGURE 1

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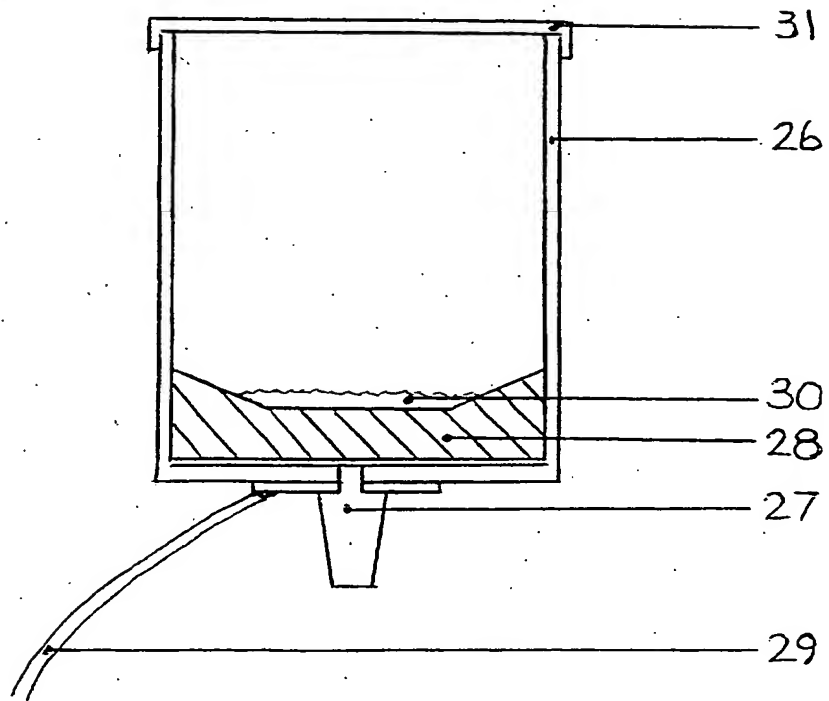


FIGURE 3

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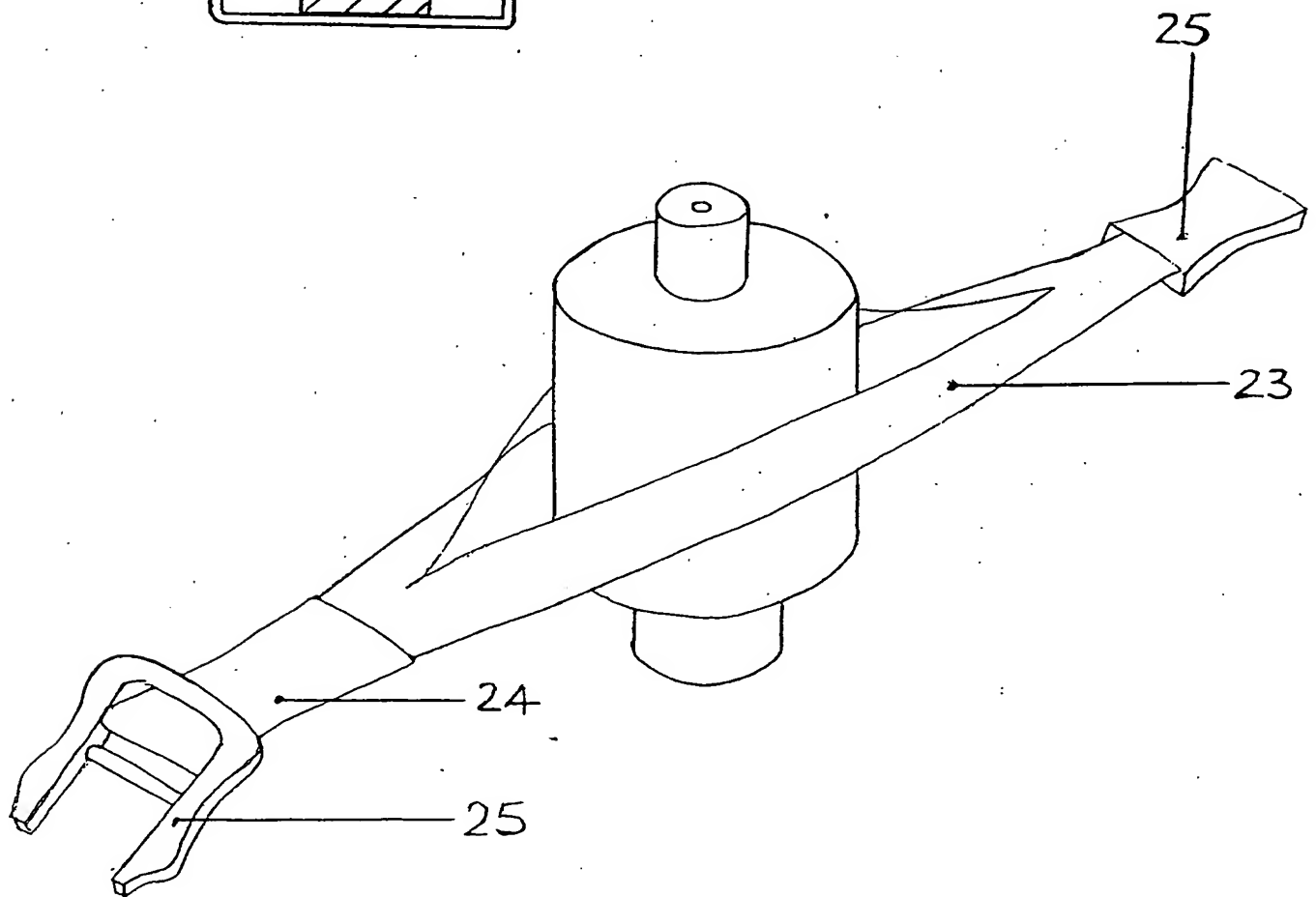
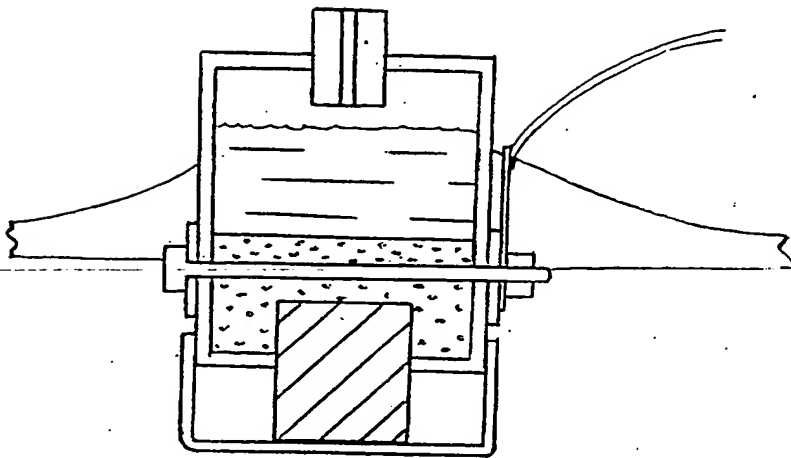


FIGURE 2

Figure 3 shows a porous body probe electrode into which the fingers or toes can be inserted.

Referring to Figure 1. This porous body probe electrode comprises a porous tip fabricated from Beer Stone or a suitable grade of Soap Stone, Limestone, Gypstone, Ancaster Stone or other porous quarried stone 10 which is sealed into a plastic tube 11 fabricated from a material having good electrical insulation properties such as Acrylic, Poly Carbonate, Polythene, Alcatene, Bakelite, Rubber or other suitable material and provided with a rubber cork 12 having a vertical air vent in the same 13. The metal bolt 14 is passed through a hole drilled in the said plastic tube and is held in place by a metal nut 15 and tightened on rubber washes 16 and 17 and a piece of absorbant cotton wool 18 is inserted round the said bolt inside the said tube. A solder tag 19 is placed under the head of the said bolt and this is wired to an insulated connecting lead 20. The tube is then filled with the isotonic saline solution 21 and a rubber cap 22 is fitted over the porous tip when not in use to prevent evaporation of the said solution.

Referring to Figure 2. This porous body probe electrode is a shortened version of Figure 1, but it is supported over the body by an elastic strap 23 and made adjustable by webbing 24 attached to the said elastic and secured by a snap buckle 25.

Referring to Figure 3. This porous body probe electrode comprises a plastic pot 26 into the base of which is inserted a metal terminal 27 and a chamferred circular porous disc 28 placed into and sealed into the pot so that it makes a good electrical connection with 27 and the other end of 27 is wired to an insulated connecting lead 29. Isotonic Saline Solution 30 is then poured into the said pot so that it just covers 28. A cap 31 makes an air tight fit over the top of 26 when not in use to prevent evaporation of the said solution.

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**POROUS BODY PROBE ELECTRODES**

This invention relates to Porous Body Probe Electrodes suitable for use on the skin of a human or animal body.

(1) The measurement of (A) small DC or AC voltages between points on the skin of a human or animal body and (B) electrical resistance or impedance between such points and (C) small currents flowing as a result of the potential differences arising naturally between certain points and other points on the human or animal body and (D) currents passing between such points as a result of the application of small external voltages being applied to

such points and

(2) (i) The effective application of external voltages to points on the human or animal body or (ii) the effective earthing of the human or animal body by an electrode in contact with part of the skin of that body and earth; are all made difficult and imprecise by variations in the oily substances and variable moisture levels on the surface of the skin which differ from individual to individual and are affected by ambient humidity and temperature levels and the amount of external pressure applied to the electrode, with the result that good reliable electrical contact is not achieved by conventional metal electrodes.

According to the present invention there is provided a porous electrode tip which makes direct contact with a small area of the skin and is fed with an isotonic saline solution which is contained in a reservoir above it and gravity fed into it. Electrical connection is made either directly to the said porous electrode tip by means of a metal contact and insulated connecting wire or by connecting such wire to a metal screw immersed in the said isotonic saline solution or in an absorbent pad in contact with the said solution.

The porous body probe electrodes can also be used for applying external voltages to the skin of the human or animal body more effectively.

A single porous body probe can also be used for earthing any part of the human or animal body effectively.

Specific embodiments of this invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 shows a porous body probe in a form suitable for holding by hand and resting upon the skin by its own weight.

Figure 2 shows a similar porous body probe electrode which can be strapped to a wrist, ankle, arm, leg or head or around any other part of the human or animal body.

### CLAIMS

- (1) A porous body probe electrode comprising a porous tip for making contact with human or animal skin which said porous tip is fed with isotonic saline solution and having means of making a good electrical connection between the said porous tip and an external insulated wire for connection to sensitive electrical measuring instruments.
- (2) A porous body probe electrode as claimed in Claim (1) which is so shaped as to be suitable for holding in the hand and resting by its own weight on the human or animal skin.
- (3) A porous body probe electrode as claimed in Claim (1) which is so shaped as to be suitable for attaching to the human or animal body or part thereof by an adjustable elastic or webbing strap and buckle so that the said electrode is kept at a constant pressure on the skin.
- (4) A porous body probe electrode as claimed in Claim (1) the chamferred porous disc part of which is so shaped as to fit into the bottom of a plastic pot onto a metal terminal connected to an insulated wire for connection to sensitive electrical measuring instruments and the plastic pot of which is suitable for accommodating a finger or toe of the human body and which said porous disc is kept moist by the pouring of isotonic saline solution into the plastic pot.
- (5) A porous body probe electrode substantially as described herein with reference to Figures 1, 2 and 3 of the accompanying drawings.

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CLAIMS

- (1) A porous stone body probe electrode comprising a porous tip for making contact with human or animal skin which said porous stone tip is fed with isotonic solution and having means of making a good electrical connection between the said porous stone tip and an external insulated wire for connection to sensitive electrical measuring instruments.
- (2) A porous stone body probe electrode as claimed in Claim (1) which is so shaped as to be suitable for holding in the hand and resting by its own weight on the human or animal skin.

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- (3) A porous stone body probe electrode as claimed in Claim (1) which is so shaped as to be suitable for attaching to the human or animal body or part thereof by an adjustable elastic or webbing strap and buckle so that the said electrode is kept at a constant pressure on the skin.
- (4) A porous stone body probe electrode as claimed in Claim (1) the chamfered porous stone disc part of which is so shaped as to fit into the bottom of a plastic pot onto a metal terminal connected to an insulated wire for connection to sensitive electrical measuring instruments and the plastic pot of which is suitable for accommodating a finger or toe of the human body and which said porous stone disc is kept moist by the pouring of isotonic saline solution into the plastic pot.
- (5) A porous stone body probe electrode substantially as described herein with reference to Figures 1, 2 and 3 of the accompanying drawings.





INVESTOR IN PEOPLE

Application No: GB 0005544.2  
Claims searched: 1-5

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Examiner: Eamonn Quirk  
Date of search: 9 August 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.R): A5R(RHEC)  
Int Cl (Ed.7): A61B (5/0408, 5/0448, 5/0478, 5/0492) A61N (1/04)  
Other: Online: WPI, JAPIO, EPODOC

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 1 363 389 (BME Corporation) Whole Document	1,2
Y	EP 0 020 288 A1 (Biotronik Mess & Therapie) see WPI abstract and figures 1-3.	1,2
Y	US 5 071 537 (Terumo Corporation) Whole Document	1,2
Y	US 3 788 317 (Pelam Inc.) fluid 22, porous pad 16	1
Y	US 3 580 239 (Bechman Instruments) see Figure 3.	1,2

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.